

## ABSTRACT:

Positioning device having a first part (1) which is movable relative to a second part (2) in a X and Y-direction, said first part (1) comprising a carrier (5) on which a system of magnets (3) is arranged in a pattern of rows (7) and columns (8) parallel to the X- and Y-direction, respectively. The magnets in each row and column are arranged in a Halbach array, i.e. the magnetic orientation of each successive magnet in each row (7) and each column (8) is rotated through 90° counter-clockwise. The second part (2) comprises an electric coil system (4) with two types of electric coils ( $C_1$ ,  $C_2$ ), one type having an angular offset of +45° and the other type having an offset of -45° with respect to the X-direction. The magnet configuration causes a very strong magnetic field. The positioning device comprises a number of magnetically sensitive sensors (Hall sensors 45) giving a signal which depends on the local mutual positions of the permanent magnets of the first part relative to the electric coils of the second part in an area in which the parts overlap.

Fig. 5